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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/713,572

11/12/2003

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EXAMINER

TALBOT, BRIAN K

ART UNIT

PAPER NUMBER

1792

MAIL DATE

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PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/713,572	<b>Applicant(s)</b> SAKURADA, KAZUAKI	
	<b>Examiner</b> Brian K. Talbot	<b>Art Unit</b> 1792	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 14 November 2008.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1,3-8,13 and 14 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,3-8 and 13-14 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

***Continued Examination Under 37 CFR 1.114***

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 11/14/08 has been entered.
2. It is noted that the submission filed 11/14/08 added new claims 9 and 10. However, Applicant is reminded that each new claim added is required to have a new assigned claimed number. Claims 9 and 10 already existed in the application (see paper filed 11/12/03) and were canceled as being directed toward a non-elected invention (see Office Action 5/30/07). Hence newly submitted claims are assigned as claims 13 and 14 respectively and will be treated as such. Applicant needs to acknowledge this is the subsequent response to this Office Action.
3. Claims 2 and 9-12 have been canceled. Claims 13 and 14 have been added. Claims 1,3-8 and 13-14 remain in the application.
4. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

***Claim Rejections - 35 USC § 103***

5. Claims 1,6,13 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Moshrefzadeh et al. (6,077,560) in combination with Speakman (6,503,831) (a) alone or (b) further in combination Nagano et al. (5,795,794).

Moshrefzadeh et al. (6,077,560) depicts a surface having protrusions and coating the surface between the protrusion whereby the protrusions extend beyond the top surface of the filler layer. This is achieved by planning the filler material (abstract and Figs. 1b,2c and 1d) JP 08-236,908 fails to teach applying the conductor patterns and insulating layer by a droplet jetting method.

Moshrefzadeh et al. (6,077,560) fails to teach ink-jetting the filler material.

Speakman et al. (6,503,831) teaches forming microvias used in printed circuit applications where one requires interconnection between circuits that are laid one on top of the other making use of an interlayer dielectric isolation. Conventional holes are machined in the interlayer to provide access from the top layer circuit to the bottom layer circuit. Ink jet printing provides a means for achieving such microvias by printing discrete areas of material such as an interlayer dielectric on top of the metal contact leaving holes at strategic positions. A second printhead may then be employed to fill the printed holes with an appropriate material. A third head is used to form the top conductor layer (col. 33, lines 5-20). This technique of ink-jetting circuitry is advantageous as it eliminated the need for expensive via forming techniques such as photolithography and etching (col. 16, lines 60-65). The layers are dried and heating to form the patterns. UV radiation is utilized to cure the coated material or to be utilized for other treatments

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step including surface pre-treatment (col. 38, lines 44-64). A surface wetting layer can be applied to the surface of a substrate to provide wetting and non-wetting areas for subsequent deposition (col. 33, lines 49-60). The conductive material includes particulates as well as colloids including metals such as gold, silver, etc. (col. 4, lines 50-60).

(a) Therefore it would have been obvious for one skilled in the art at the time the invention was made to have modified Moshrefzadeh et al. (6,077,560) structure by forming the insulating layers by a ink-jetting process as evidenced by Speakman (6,503,831) with the advantages associated therewith, i.e. avoiding CMP to form a planar level as well as eliminating the need for via formation as detailed by Speakman (6,503,831) above.

(b) Moshrefzadeh et al. (6,077,560) in combination with Speakman (6,503,831) fail to teach specifically "filling or completely filling" the cavity with the second dielectric layer.

Nagano et al. (5,795,794) teaches a process whereby two dielectric layers are applied. The first dielectric layer having an unevenness with valleys and the second subsequent layer filling in those valley to provide a flat even surface (abstract and col. 3, line 60 – col. 4, line 8).

Therefore it would have been obvious for one skilled in the art at the time the invention was made to have modified Moshrefzadeh et al. (6,077,560) in combination with Speakman (6,503,831) by forming the dielectric layers to produce a flat even surface as evidenced by Nagano et al. (5,795,794) with the expectation of achieving similar success, i.e. producing a flat even surface.

With respect to claim 6 and the size of the droplets, it is the Examiner's position that this is a "result effective" variable which can be optimized by a practitioner in the art through routine

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experimentation and therefore does not render as a patentable difference absent a showing of criticality regarding the size of the droplets.

6. Claims 3-5,7 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Moshrefzadeh et al. (6,077,560) in combination with Speakman (6,503,831) (a) alone or (b) further in combination Nagano et al. (5,795,794) still further in combination with JP 10-221,698 and JP 11-163,499.

Moshrefzadeh et al. (6,077,560) in combination with Speakman (6,503,831) (a) alone or (b) further in combination Nagano et al. (5,795,794) fail to teach measuring and forming data on the circuitry to control the deposition of the insulating layer.

JP 10-221,698 teaches controlling paste quantities upon a substrate by utilizing a computer system to control the distance between the nozzle and the substrate (abstract).

JP 11-163,499 teaches controlling ink-jet deposition by connecting the ink jetting system to a computer and forming graphic information regarding the deposition of the conductive and insulative coating materials.

Therefore it would have been obvious for one skilled in the art at the time the invention was made to have modified Moshrefzadeh et al. (6,077,560) in combination with Speakman (6,503,831) (a) alone or (b) further in combination Nagano et al. (5,795,794) multilayer printed circuit board process by utilizing a computer to measure and input data as evidenced by JP 10-221,698 and JP 11-163,499 because of the advantages associated with computer controlled system, i.e. increased precision/accuracy of deposition. Furthermore, it is well settled that it is

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not invention to broadly provide a mechanical or automatic means to replace a manual activity which has accomplished the same results. *In re Venner and Bowser* 120 USPQ192.

***Response to Amendment***

7. Applicant's arguments filed 11/14/08 have been fully considered but they are not persuasive.

Applicant argued that the conductive posts are formed first and then the insulative material is formed around the posts whereby the post remains higher than the level of the insulative material.

Moshrefzadeh et al. (6,077,560) depicts a surface having protrusions and coating the surface between the protrusion whereby the protrusions extend beyond the top surface of the filler layer. This is achieved by planning the filler material (abstract and Figs. 1b,2c and 1d)

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Brian K. Talbot whose telephone number is (571) 272-1428. The examiner can normally be reached on Monday-Friday 8AM-4PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Timothy H. Meeks can be reached on (571) 272-1423. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Brian K Talbot/  
Primary Examiner, Art Unit 1792

BKT